



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/518,627	08/08/2005	Shigeo Shirakura	Q85332	3522
23373 7590 05/12/2008 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037				
EXAMINER				
LIAO, DIANA J				
ART UNIT		PAPER NUMBER		
1793				
MAIL DATE		DELIVERY MODE		
05/12/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

## Application No.

10/518,627

## Applicant(s)

SHIRAKURA, SHIGEO

## Examiner

DIANA J. LIAO

## Art Unit

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 08 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)  
Paper No(s)/Mail Date 8/8/2005.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

#### ***Priority***

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. JP 2002-181180, filed on 6/21/2002.

#### ***Information Disclosure Statement***

2. The information disclosure statement (IDS) submitted on 8/8/2005 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

#### ***Status of Application***

3. Claims 1-15 are presented for examination.

#### ***Specification***

4. The abstract of the disclosure is objected to because it is not a single paragraph. Correction is required. See MPEP § 608.01(b).

#### ***Claim Objections***

5. Claims 2 and 6 are objected to because of the following informalities: Claim 2 contains a typographical error at the end of the claim: "form the regeneration water" should be "from the regeneration water". Claim 6 contains also contains a typographical error: "No<sub>x</sub>" should read "NO<sub>x</sub>". Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites a limitation "without performing a heavy metal treatment step" at the end of the claim. It is unclear if this limitation refers to and implicitly states that the water contains heavy metals but is not treated to remove the heavy metals, there are no heavy metals contained on the deactivated catalyst and thus no heavy metals present at all, or if heavy metals remain on the catalyst and it is the catalyst that does not undergo a heavy metal treatment step.

Claim 9 recites that the NO<sub>x</sub> removal catalyst is replaced "without drying the catalyst before installation" at the end of the claim. Claim 9 depends on claim 1, which recites a step for "removing water from the catalyst". Removing water is normally considered in the art to be equivalent to drying. Thus, as claimed, claim 9 is either improperly dependent or the term "drying" and when it occurs or does not occur needs to be better defined.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dittmer, et al. (US 6,241,826), optionally in view of Schneider, et al. (US 6,232,254).

Dittmer '826 teaches a process for regenerating catalytic converters, including those used for reducing NO<sub>x</sub> gases in vented air from power plants. (col 1, lines 4-14) After pretreatment in a positive displacement reactor using water as a solvent (col 2, lines 8-15), the catalyst is transferred to an ultrasonic reactor (col 2, lines 32-37) The cleaning liquid in the ultrasonic reactor is water and the treatment is done between the freezing and boiling points of the liquid, preferably at 40-80°C. (col 2, lines 51-57) If there are still residues on the catalyst, it is further rinsed with a liquid, such as distilled water or tap water. (col 2, lines 58-64) In an exemplary embodiment, Dittmer '826 teaches the use of distilled, described also as demineralized water with no additives, for

Art Unit: 1793

pretreatment, rinsing, ultrasonic treatment, and further rinsing. (col 3, lines 17-21, 52; col 4, lines 28, 36, 53) This distilled, demineralized water, with no additives, is interpreted to be as pure as possible and have no chlorine or cleaning components therein. The water from the treatment steps are sent to a wastewater treatment system. (col 3, lines 45-48) After the final rinsing step, the catalytic converter is dried until the relative humidity is satisfactory (col 4, lines 57-62), thus removing the water. The temperature in the positive displacement reactor is from 25-35°C. (col 4, lines 13-14) The term "ambient temperature" as defined by the instant application is a temperature within the range of about 5°C and 40°C (page 17) and thus the temperatures taught in Dittmer '826 fall within the definition. Dittmer '826 teaches the catalyst converters to be fully immersed during the pretreatment in the positive displacement reactor. (col 3, line 55)

Dittmer '826 is silent regarding the regeneration water without performing a heavy metal treatment step. Dittmer '826 also does not teach immersing the catalyst until bubbling stops, using the regeneration water repeatedly before wastewater treatment, or assessing the catalyst for performance before installing the catalyst back into a flue gas apparatus. Dittmer '826 also does not teach that the catalyst is not dried before reinstallation into the NO<sub>x</sub> removal apparatus.

The lack of a heavy metal treatment step is found to be inherent or obvious in view of Dittmer '826. If there is no need to remove the heavy metals, such as if the catalyst did not contain heavy metal contamination, no heavy metals are contained in the water after regeneration or if the subsequent use of the water is not sensitive to

Art Unit: 1793

heavy metal contaminants, the heavy water treatment is not necessary. Treating the used regenerating water without a heavy metal treatment is not found patentable over the prior art.

Immersing the catalyst into water until bubbling stops is also held to be obvious in view of Dittmer '826. It would be obvious to immerse the catalytic converter in water for an effective amount of time, whether or not it is coincidental with the time of bubbling. One of the pretreatment steps in Dittmer '826 is also taught to allow liquid to enter the porous structure of the catalytic converter in order to loosen the contaminants in the material. (col 2, lines 10-15) Liquid entering a porous structure that was originally used in a gaseous environment, such as a  $\text{NO}_x$  converter, should cause bubbling, and thus a complete immersion would be indicated by the cessation of bubbling.

It would also be obvious to assess the catalyst before reinstallation into a flue gas apparatus. One of ordinary skill in the art would at least periodically assess the effectiveness or quality of a catalyst before reinstalling a regenerated catalyst into an apparatus since catalysts need to be replaced from normal use even if almost fully regenerated. One would be motivated to test the catalytic performance of the catalyst before installing in order to avoid having to manipulate a large industrial process if it is found later that the catalyst reinstalled was no longer effective. Assessing the catalyst before reinstallation could involve another isolated apparatus without dealing with the general, possibly continuous, industrial process. Therefore it would be obvious to test catalyst activity before installation in order to avoid putting an ineffective catalyst into the main operations.

Regarding not drying the catalyst, it would have been obvious to one of ordinary skill in the art to install the catalyst without drying in order to save time and money. Dittmer '826 teaches that the drying chamber is at a temperature of 200-400°C (claim 13) and that the NO<sub>x</sub> removal process usually takes place at about 300-400°C. One of ordinary skill in the art would have appreciated the possibility of using just the flue gas which needs NO<sub>x</sub> to be removed to dry the catalyst in order to eliminate an additional drying step.

The use of regeneration water for a plurality of regeneration steps is also found to be obvious to one of ordinary skill in the art. It would be obvious to use the regeneration water as many times as possible before treatment as long as it was found to be effective in order to save on costs in water treatment. Since the process taught in Dittmer '826 involves movement of catalytic converters by way of crane (col 3, lines 49-50; col 4, lines 27-28; 48-49) it is feasible that the water remains in the basins while converters are continuously changed and brought from one basin to the other. In addition, Dittmer '826 teaches the treatment of catalytic converters, plural, being introduced into the basin for desired effects (col 3, lines 63-65), suggesting that multiple converters are treated at the same time, which would meet the instant claims stating that the regeneration water is used for regenerating another NO<sub>x</sub> removal catalyst. Therefore, the use of regeneration water a plurality of times is found to be obvious.

Optionally, Schneider '254 teaches a method for cleaning and/or regenerating a deactivated catalyst for use in nitrogen scrubbing. The method utilizes demineralized



Art Unit: 1793

water. (abstract) The water is used to dissolve and remove the surface layer of the catalyst. (col 3, lines 5-8) The cleaning and regeneration of the catalytic devices is performed at ambient temperatures. (col 3, lines 20-22) Schneider '254 also teaches a process, represented by Figure 3, where the catalysts are contacted with demineralized water in a scrubber (6) and the used regenerating fluid is sent to a separator (8) and later a settling tank (9) with the overflow of liquid sent through lines (12, 13) directly back into the tank for desalinated water (11) where it is sent back as regenerating fluid to the scrubber (6). Water which is particularly contaminated with solids are taken from the bottoms of the settling tank (9) and sent through a line (10) to a water treatment plant. (described col 4, lines 10-33) The catalyst may be dried using stack gas or hot air. (col 4, lines 58-59)

A regenerating step at ambient temperatures and the use of regenerating water a plurality of times is found to be obvious in view of Schneider '254. The regeneration with demineralized water is performed at ambient temperatures so that no further heating step is necessary. (col 3, lines 21-23) One would be motivated to perform the step at ambient temperatures in the process taught in Dittmer '826 in order to reduce heating costs. The use of regenerating water a plurality of times is also taught in Schneider '254 in that overflow effluent from the scrubbing process is sent right back with fresh water to another scrubbing step. One would be motivated to reuse regenerating water as much as possible in order to reduce costs. Schneider '254 teaches that low consumption of regenerating fluid is an advantageous goal. (col 4, lines 59-61)

Regarding not drying the catalyst before installation, Schneider '254 does teach the use of stack gas or hot air to dry. Flue gas is a kind of stack gas and thus it would be obvious to one of ordinary skill in the art to simply place the catalyst back into the system, so that it may be dried as well as begin catalyzing the removal of NO<sub>x</sub> gases as soon as it is suitable. This would reduce time and money spent on the regeneration process.

Therefore, a regeneration step at an ambient temperature, the use of regeneration water a plurality of times as taught in Schneider '254, and not drying the catalyst before reinstallation is found to be obvious for use in Dittmer '826 in order to save costs and resources.

Claims 1-11 are not found patentable over the prior art.

11. Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dittmer '826 and optionally Schneider '254 as applied to claims 1-11 above, and further in view of Sueyoshi, et al. (JP 53-125964).

Dittmer '826 does not teach that the catalyst is not dried before installing back into the NO<sub>x</sub> removal apparatus. Dittmer '826 is silent as to how the catalyst is oriented when it is installed into a NO<sub>x</sub> removal apparatus. Dittmer '826 does not teach that the catalyst is inverted with respect to the direction of the flow of discharge gas when it is installed after regeneration.

JP '964 teaches an apparatus wherein a catalyst unit is placed in a device so that it can be easily inverted in order to ensure even deterioration of the catalyst. (page 2,

Art Unit: 1793

left column, last paragraph) It would be obvious to incorporate this technique into the process of Dittmer '826 in order to have the catalyst wear down more uniformly. One would be motivated to include catalyst inversion when installing in the process of Dittmer '826 improve the overall health and lifetime of the catalyst and also the uniformity of reaction. Therefore, claims 12-15 are not found patentable over the prior art.

### ***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Budin, et al. (US 6,484,733).

Claims 1-15 have been rejected. No claims have been allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DIANA J. LIAO whose telephone number is (571)270-3592. The examiner can normally be reached on Monday - Friday 8:00am to 5:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ngoc-Yen M. Nguyen/  
Primary Examiner, Art Unit 1793

DJL